REMARKS

The undersigned and Mr. Willkens wish to thank Primary Examiner Jeffrey for the courtesy and helpful comments extended during the recent interview.

At the interview, the good time-to-temperature ignition properties of preferred igniters of the invention were discussed, including that the combined use of a booster zone together with hot and cold zones and a hot zone of limited path length can provide exceptional time-to-temperature values such as three seconds or less. Independent claims 1 and 26 recite that time-to-temperature value. See also page 5, last paragraph of the application where the term "time-to-temperature" is discussed.

Mr. Willkens and Primary Examiner Jeffrey also discussed the test results of record – particularly Example 2 of the application as filed and Dr. Yu's Declaration -- that demonstrate such time-to-temperature performance of igniters of the invention as well as the importance with respect to time-to-temperature performance of use of a limited hot zone path length in combination with a booster zone.

At the interview, Examiner Jeffrey recommended that an RCE be filed. Accordingly, such filing has been made.

Claim 1 has been amended and claims 25-29 have been added. No new matter has been added by virtue of the amendments. For instance, support for the amendments appears e.g. at page 5, last paragraph; page 7; page 13 last paragraph and the original claims of the application.

Applicant's claimed invention is directed to ceramic igniter devices that have a first conductive zone of relatively low resistance, a power enhancement zone of intermediate resistance, and a further hot or ignition zone of relatively higher resistance.

Applicant has surprisingly discovered that igniters of the invention can provide extremely fast time-to-ignition temperatures, include ignition times of 3 seconds or less, or even 2 seconds or less. This is demonstrated for instance by the results shown in Example 2 of the application.

Such results are clearly significant. Applicant's preferred rapid-ignition ceramic igniters can replace spark ignition systems where an extremely fast time-to-temperature is required. This is discussed for instance at page 3, line 28 through page 4, line 3 of the application as follows:

> It has been surprisingly found that igniters of the invention can provide extremely high speeds, including time-to-temperature of less than two seconds, and even less than about one-and-one half seconds or about one second, at both nominal voltages and low-end line voltages (85 percent of a specified nominal voltage). See, for instance, Example 2 which follows. Thus, for the first time, ceramic igniters are provided that can replace spark ignition systems where an extremely fast time-to-temperature is required, e.g. for an ignition source for instantaneous water heating systems, cooltops, and the like.

The sole outstanding rejection is of claims 1-23 under 35 U.S.C. 103 over Axelson (U.S. Patent 5,705,261) in view of Willkens (U.S. Patent 5,786,565). The rejection is traversed.

As discussed in Applicant's prior response, the Axelson patent recites a portion 14 that is described as being preferably omitted for ease of manufacture. See the cited Axelson patent at col. 4, lines 30-32. In the Examples of the Axelson patent, an intermediate zone is not described. Note the Axelson patent at column 5, lines 50-55, where an intermediate zone is not mentioned.

Indeed, the Axelson patent nowhere contemplates the effect and performance that can be provided by Applicant's claimed booster zone region, including the fast time-to-ignition temperatures that are demonstrated for instance in Example 2 of the application.

The Axelson patent also does not mention lengths of a hot zone or an intermediate zone. The Axelson patent also shows a hairpin or "slotted" igniter that does not contain an interposed heat sink zone.

Thus, the Axelson patent does not disclose the hot zone path length, or the significance thereof, as Applicant discloses and claims. Nor does the Axelson patent mention the booster zone path lengths as recited in Applicant's claims 21-22, or an interposing heat sink zone (i.e. a "slotless" construction) as recited in Applicant's claims 23-24.

As discussed at the interview, Example 1 of the Axelson document states (col. 5, lines 43-48):

> A double-legged hairpin ("U-shaped") ceramic igniter as shown in FIG. 1 was prepared ... in accordance with the teachings of the Washburn patent. [i.e. U.S. Patent 5,045,237, see col. 4, lines 19-21 of Axelson].

The Washburn patent (i.e. U.S. 5,045,237, copy enclosed) discloses igniters having a hot zone path length well in excess of 2 cm. See, for instance, U.S. Patent 5,045,237 at col. 7, line 62 through col. 8, line 3 and Example I and II at cols. 9 through 12.

The addition of the cited Willkens patent does not sustain the rejection.

At page 3 of the Office Action, the following is stated:

> The claims differ from the [Axelson patent] in calling for the hot zone length to be 2 cm or less. However, Willkens teaches forming the hot zone such that it is less than 0.5 cm. See abstract. By providing hot zones of relatively short length, isolated temperature gradients are avoided that can cause premature failure. In view of Willkens, it would have been obvious to one of ordinary skill in the art to provide a hot zone length (i.e., 2 cm or less) for the hot zone igniter in Axelson so that isolated temperature gradients are avoided that could cause premature failure.

Applicant respectfully disagrees with such basis for rejection.

Among other things, the cited disclosure of the Willkens patent is to an igniter where the hot zone directly adjoins cold, conductive zones and a heat sink zone.

Indeed, the cited Willkens patent notes the importance of the heat sink zone at column 3, lines 30-35, which reads as follows:

> Without wishing to be tied to a theory, it is believed the added thermal mass of the heat sink significantly slows convective cooling of the hot zone, thereby allowing the hot zone to remain hot under convective cooling conditions despite its small size.

In contrast, as mentioned above, the Axelson patent also shows a hairpin or "slotted" igniter that does not contain an interposed heat sink zone.

It is not seen that a skilled worker would have had any particular incentive to select a single feature (hot zone length) of the cited igniter of the Willkens patent with a heat sink zone and insert that selected aspect into a distinct igniter that does not contain an interposed heat sink zone.

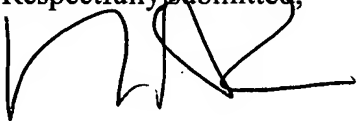
Moreover, while Applicant's fully believe that a *prima facie* case under 35 U.S.C. 103 is not presented by the cited combination of documents, it is also believed that the test data of record fully rebuts any *prima facie* case that may be contended to exist.

Thus, for instance, the comparative test results set forth in Dr. Yu's Rule 132 Declaration of record show that insufficient hot zone temperatures and time-to-temperature values can be provided where an igniter with a booster has a hot zone path length in excess of 2 cm. See Figures 1 and 2 of the Declaration.

In view thereof, reconsideration and withdrawal of the rejection is requested.

It is believed the application is in condition for immediate allowance, which action is earnestly solicited.

Respectfully ~~submitted~~,



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